

A NEW SPECIES OF *LEPIDOTRIGLA* (PISCES, TRIGLIDAE) FROM THE KERMADEC ISLANDS OF THE SOUTH PACIFIC

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ABSTRACT

A new species of *Lepidotrigla* from the Kermadec Islands in New Zealand waters is described. This species differs from *Lepidotrigla brachyoptera* Hutton, the other New Zealand *Lepidotrigla*, in having smaller scales (20 rows below the lateral line versus 10-11), more second dorsal and anal fin rays (D_2 Dorsal 16-18, mean 16.9 versus 15-17, mean 15.7 and Anal 16-18, mean 17.3 versus 16-18, mean 16.4), narrower interorbital width (5.3-6.0%SL, mean 5.6%SL versus 6.0-9.8%SL, mean 8.3%SL), and shorter gill rakers (1.3-1.7%SL, mean 1.5%SL versus 2.0-2.7%SL, mean 2.3%SL). The two species are allopatric but appear to be more closely related to each other than to other congeners. *L. brachyoptera* is redescribed and compared with the new species.

While examining fishes in the Museum of New Zealand Te Papa Tongarewa, Wellington, New Zealand, the Collection Manager, Andrew Stewart, called to my attention a lot of triglids identified as *Lepidotrigla brachyoptera* Hutton 1872 which had been collected in the Kermadec Islands situated 800 km northeast of New Zealand, but within New Zealand territorial waters. Upon examination it was clear that this is a new species easily separable from *L. brachyoptera*. It is with great pleasure that I name this species *Lepidotrigla robinsi* on the occasion of this festschrift issue honoring C. Richard Robins, a distinguished ichthyologist, colleague, and friend. Since this new species is closely allied to *L. brachyoptera*, a redescription of that species is provided.

METHODS AND MATERIALS

Methods follow Richards (1992) as emended from the earlier work by Richards and Saksena (1977). One additional measurement is the length of the gill raker of the first ceratobranchial and is based on the length of the longest raker on that bone measured from its base on the ceratobranchial to its distal tip. Museum abbreviations follow Leviton et al. (1985). The type material has been dispersed to several museums at the kind suggestion and permission of the Museum of New Zealand Te Papa Tongarewa staff.

Lepidotrigla robinsi new species

Table 1, Figures 1 and 2

Diagnosis.—A species of *Lepidotrigla* with a prominent spiny projection of the rostral process of the first infraorbital bone [type M of Richards (1992)]; opercular spine short, barely projecting to edge of opercular flap; pectoral fin of moderate length (30.9-38.2%SL) reaching anal fin origin; scales weakly attached, ctenoid above and immediately below lateral line (transforming cteni type of Roberts, 1993), grading to cycloid on the belly; nape scaled, breast and interpelvic area naked, belly scaled; lateral line scales 64-67, 3 to 5 scale rows above and 21 to 26 rows below the lateral line; 9 first dorsal spines, 16-18 second dorsal rays, 16-18 anal rays, 11 plus 3 free pectoral rays; 25-26 bucklers along base of dorsal fins; 34 vertebrae (11 precaudal, 23 caudal); head length short (27.1-29.7%SL); interorbital width narrow (5.3-6.0%SL); 6-7 short (1.3-1.7%SL) gill rakers on the first ceratobranchial.

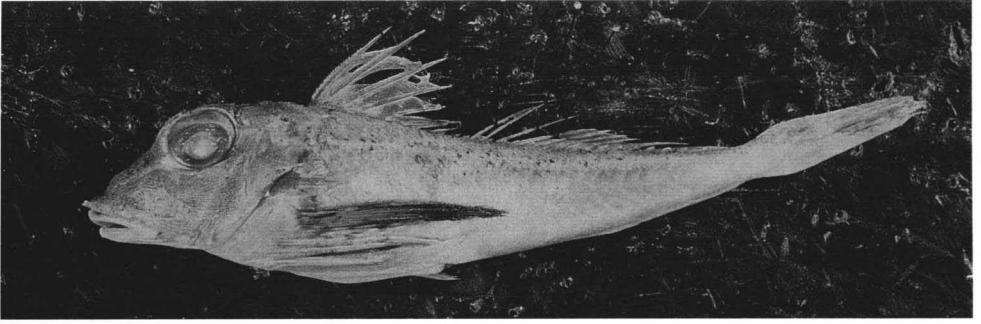


Figure 1. Lateral view of the holotype of *Lepidotrigla robinsi* new species, NMNZ P31392, 121.7 mm SL.



Figure 2. Dorsal view of the head (upper) and view of the inner surface of the pectoral fin (lower) of the holotype of *Lepidotrigla robinsi* new species, NMNZ P31392.

Table 1. Measurements and counts for the type series of *Lepidotrigla robinasi* and ranges for *Lepidotrigla brachyoptera* (based on 20 specimens)

Characters Measurements	Lepidotrigla robinasi						Lepidotrigla brachyoptera		
	NMN/Z P.31392	AMS I.34984-001	NMN/Z P.13445	USNM 332058	BMNH 1994.11.1.1	NMN/Z P.13445	USNM 332058	Mean %SL	Range
S.L.	121.7	114.7	110	106.8	102.6	98.8	97		
Head length	33.6	32.2	32.7	31.1	27.8	26.9	28		
%SL	27.6	28.1	29.7	29.1	27.1	27.2	28.9	28.2	25.7–33.7
Premaxillary L.	13.6	14.3	13.7	14	12.2	13	11.7		
%SL	11.2	12.5	12.4	13.1	11.9	13.2	12.1	12.3	12.8–15.2
Orbital width	12.3	11.2	10.3	11.6	10.7	9.7	9.9		
%SL	10.1	9.8	9.4	10.9	10.4	9.8	10.2	10.7	8.5–12.5
Orbital depth	11.4	9.5	9.6	11.4	9.9	9.3	8.5		
%SL	9.4	8.3	8.7	10.7	9.6	9.4	8.8	9.3	9.2–10.6
Cheek height	9.2	10.4	10.3	9.9	9.5	9.1	9		
%SL	7.6	9.1	9.4	9.3	9.3	9.2	9.3	9	9.2–10.7
Interorbital width	6.6	6.2	6	6.3	5.4	5.9	5.8		
%SL	5.4	5.4	5.4	5.9	5.3	6	6	5.6	6–9.8
Cleithral spine L	13.1	15.4	13.6	16.3	12.7	12.9	12.2		
%SL	10.8	13.4	12.4	15.3	12.4	13	12.6	12.8	13.3–15.4
Opercular spine L	7.5	7.9	8.3	8	6.7	7.2	7.7		
%SL	6.2	6.9	7.5	7.5	6.5	7.3	7.9	7.1	6.5–8
1st Dorsal spine L	17.2	18.3	18.8	17.5	17.9	15.9	15.7		
%SL	14.1	15.9	17.1	16.4	17.4	16.1	16.2	16.2	13.4–16.6
2nd Dorsal spine L	22.9	21.6	21.9	22.1	21.1	19.8	20.1		
%SL	18.8	18.8	19.9	20.7	20.6	20	20.7	19.9	15.8–18.7
3rd Dorsal spine L	21.9	21.5	21.4	19.8	20.8	19.2			
%SL	18	18.7	19.4	18.5	20.7	19.4		19.1	16.2–19

Table 1. Continued

Characters Measurements	Lepidotrigla robinet							Lepidotrigla brachyoptera		
	NMNZ P13192	AMS 1.34984-001	NMNZ/ P13445	USNM 332058	BMNH 1994.11.1.1	NMNZ/ P13445	USNM 332058	Mean %SL	Mean	Range
Pectoral fin L	37.6	39	41.1	37.5	38.1	36.5	37.1			
%SL	30.9	34	37.4	35.1	37.1	36.9	38.2	35.7	32.3	27.9–36.4
1st Free pectoral ray L	27.3	28.7	26.1	28.5		26.3	23.5			
%SL	22.4	25	23.7	26.7		26.6	24.2	24.8	24.5	22.7–26.3
Gill raker L	1.8	1.8		1.8	1.5	1.3				
%SL	1.5	1.6		1.7	1.5	1.3		1.5	2.3	2–2.7
Body depth	24.5	27.8	25.5	23.5	22.3	21.5	21.4			
%SL	20.1	24.2	23.2	22	21.7	21.8	22.1	22.1	24.8	22.8–26.7
Body width	21.1	23.6	20.8	21	19.3	18	17.7			
%SL	17.3	20.6	18.9	19.7	18.8	18.2	18.2	18.8	19.3	17.9–21.7
Caudal peduncle depth	6.3	6.1	5.9	5.9	5.3	5.4	5.4			
%SL	5.2	5.3	5.4	5.5	5.2	5.5	5.6	5.4	5.5	5–6
Counts										
	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Mean	Range
1st Dorsal spines	9	9	9	9	9	9	9	9	9	8–10
Bucklers	26	26	25	26	26	25	25	25.6	23.8	22–25
2nd Dorsal rays	18	16	16	17	17	17	17	16.9	15.7	15–17
Anal rays	18	16	18	17	17	17	18	17.3	16.4	16–18
Pectoral fin rays (+3)	11	11	11	11	11	11	11	11	11.1	11–12
1st Epibranchial rakers	0	0	0	0	0	0	0	0	1	1–1
1st Epibranchial rudiments	1	1	1	0	0	0	1	0.6	1	1–1
1st ceratobranchial rakers	7	7	6	6	7	7	7	6.7	6.1	6–7
1st Ceratobranchial rudiments	3	4	3	4	4	4	2	3.4	2.7	2–3
1st Hypobranchial rudiments	1	0					3	1.3	4	4–4
Lateral line scales	67	66	66	64	65	66		65.7	63.7	60–66
Scales above lateral line	5	3	5	4				4.2	2.9	2–3.5
Scales below lateral line	26	21	26	23				24	10.6	10–12

Holotype.—NMNZ P.31392, 121.7 mm SL, South Pacific Ocean, Kermadec Islands at Raoul Island between Meteorological Station and Hutchinson Bluff, approx. 29°10'S, 177°50'W, 110–146 m depth, taken in a beam trawl from the R/V ACHERON, 4 April 1973.

Paratypes.—All taken with the Holotype. NMNZ P.13445, 2(98.8–110.0 mm SL); USNM 332058, 2(97.0–106.8 mm SL); BMNH 1994.11.1.1, 102.6 mm SL; AMS I.34984–001, 114.7 mm SL.

Description.—Measurements and counts for the holotype and paratypes are given in Table 1. Rostral spines of first infraorbital bone are type M of Richards (1992, p.46)—produced structure with many spines (Fig. 2); nuchal spine long extending beyond dorsal fin origin; postorbital groove present with parietal ridge posteriorly and otic ridge posterior to eye; eye large (9.4–10.9%SL); sharp spines on anterodorsal orbital rim; opercular spine short extending slightly beyond opercular membrane; preopercular spine short with slight ridge extending onto cheek; no nasal spines; cleithral spine strong (10.8–15.3%SL); first dorsal fin spines serrate on anterior edge; nape fully scaled; breast, prepectoral area and interpelvic area scaleless, belly fully scaled; trunk scales easily lost, those remaining on nape, above lateral line, and immediately below lateral line with ctenii, those on belly without ctenii. Scales small, in 3–5 rows above lateral line and 21–26 rows below lateral line. Lateral line scales higher than wide with 7 tubes anteriorly gradually reduced to 3 tubes posteriorly and scales progressively smaller posteriorly. Gill rakers short (1.3–1.7%SL) bearing short spines, 6–7 on first ceratobranchial, 1 or 0 rudiments on first epibranchial, 2–4 rudiments on first ceratobranchial, and 1–3 rudiments on first hypobranchial. Baudelot's ligament on 1st vertebra; 1st closed hemal arch on 10th vertebra. First two neural spines close together; dorsal pterygiophores interdigitating as follows (based on cleared and stained smallest paratype): first between 2nd and 3rd neural spines, 2nd and 3rd between neural spines 3 and 4, remaining interdigitating singly except 13th and 14th between neural spines of vertebrae 13 and 14, last pterygiophore followed by stay. First dorsal pterygiophore supporting first 2 dorsal fin spines (first directly, second serially) remaining pterygiophores each supporting 1 spine or ray serially except 9th which has no spine associated with it. First two anal pterygiophores associated with hemal spine of 12th vertebra and bearing 3 anal rays, 3rd pterygiophore interdigitating between hemal spines of vertebrae 12 and 13 and 4th through 15th interdigitate singly while last two interdigitate between hemal spines of 25th and 26th vertebrae. Last pterygiophore followed by stay. Caudal complex with hypurals 1 and 2 fused, 3 and 4 fused, and 5th free; parhypural resting against hypurals and having strong lateral projection; complex supporting 8 upper and 7 lower caudal fin rays. Eleven upper secondary caudal rays and 11 lower secondary caudal rays. No uroneurals; 2 epurals above last vertebra with 1 adjacent to dorsal parapophysis of 33rd vertebrae. Cartilage located at posterior ends of epurals 2 and 3 and 5th hypural, and 2 pieces of cartilage between end of parhypural and last autochthonous hemal spine, and another piece at end of hemal spine of 32nd vertebrae. Vertebrae total 34 with 11 precaudal and 23 caudal.

Color in Alcohol.—Head mottled with irregular dark spots, first dorsal fin with subterminal row of spots on spines, distal portion of membrane clear, with remainder with a fine scattering of small spots giving fin a gray appearance; irregular spots on remaining portion of spines; second dorsal fin with terminal row of spots and one to two rows of spots medially; caudal fin clear on base but with heavy spotting posteriorly except along dorsal and ventral edges of fin; inner



Figure 3. Lateral view of *Lepidotrigla brachyoptera*, USNM 332059, 126.4 mm SL.

portion of pectoral fin black from upper rays 1 to 9; membranes of rays 9–11 clear but rays dark spotted; upper ray 1 also spotted near base; free pectoral rays darkly spotted, uppermost with 6 spots forming bands around ray, second free ray with about 4 bands, third with 1 band; upper portion of flank and lateral line darkly mottled with mottling on edges of scale pockets; lower portion of flank, anal and pelvic fins clear. Life colors unknown.

Etymology.—This species is named in honor of C. Richard Robins, Maytag Professor of Ichthyology at the Rosenstiel School of Marine and Atmospheric Science, University of Miami, upon his retirement. He has made outstanding contributions to ichthyology, has been a most helpful colleague, and a very dear friend.

Distribution.—Known only from a single collection from Raoul Island in the Kermadec Island chain, southwest Pacific Ocean.

Discussion.—This new species is most closely related to *L. brachyoptera* and differs from it in smaller scale size, shorter gill raker length, and meristics (greater number of dorsal and anal fin elements). The affinities of both species lie with the temperate fauna of the South Pacific as discussed below.

Lepidotrigla brachyoptera Hutton 1872

Table 1, Figures 3 and 4

Lepidotrigla brachyoptera Hutton 1872: 27(original description); Paulin et al. 1989: 170, 259 (key, list); Richards 1992 :52, 54, 62(characters, nomenclature).

Material Examined.—NMNZ P.10569, 139.5 mm SL, New Zealand, off Oamaru, 41°07'S, 174°22'E, 45.7 m depth; NMNZ P.20947, 3(114.3–137.2 mm SL), New Zealand, east of the Chatham Islands, 43°31.9'–30.0'S, 176°07.5'–11.0'W, 228–234 m; USNM 332059 (formerly NMNZ P.1193), 4 (116.7–126.4 mm SL, smallest cleared and stained), New Zealand, off Oamaru, 45°06'S, 170°59'E, 120 m depth; NMNZ P.20926, 3(115.8–118.8 mm SL, New Zealand, subantarctic slope of the Chatham Rise, 43°34.2'–33.0'S, 175°59.0'–176°02.0'W, 228–234 m depth; NMNZ P.26482, 100.5 mm SL, New Zealand, Chatham Islands, east of Okawa Point, 43°47.3'S, 176°05.1'W, 112–121 m; NMNZ P.5027, 2(81.7–97.5 mm SL, New Zealand, Torrent Bay, Tasman Bay, 40°57'S, 173°03'E, 49 m depth; NMNZ P.22581, (92.6 mm SL), New Zealand, Wellington Harbor (topotype), 41°16'S, 174°50'E; NMNZ P.12076, 3(74.9–79.5 mm SL), New Zealand, North of Manukau Harbour, 36°54'–57'S, 174°04'–06'E, 113 m; NMNZ P.17173, 49.7 mm SL, New Zealand, ENE of Tolaga Bay, 38°15.2'S, 178°38.6E, 139 m; NMNZ P.12075, 40.6 mm SL, New Zealand, Stewart Island, north arm of Port Pegasus, 47°09'S, 167°42'E, 36–43 m depth; NMNZ P.25359, 33.7 mm SL, New Zealand, WNW of Cape Egmont, 38°48.8'S, 173°29.6'E, 146 m; NMNZ P.2156, 2(24.0–27.9 mm SL), New Zealand, off Otago, 45°40'S, 170°51'E, 36 m depth.

Diagnosis.—A species of *Lepidotrigla* with a prominent spiny projection of the

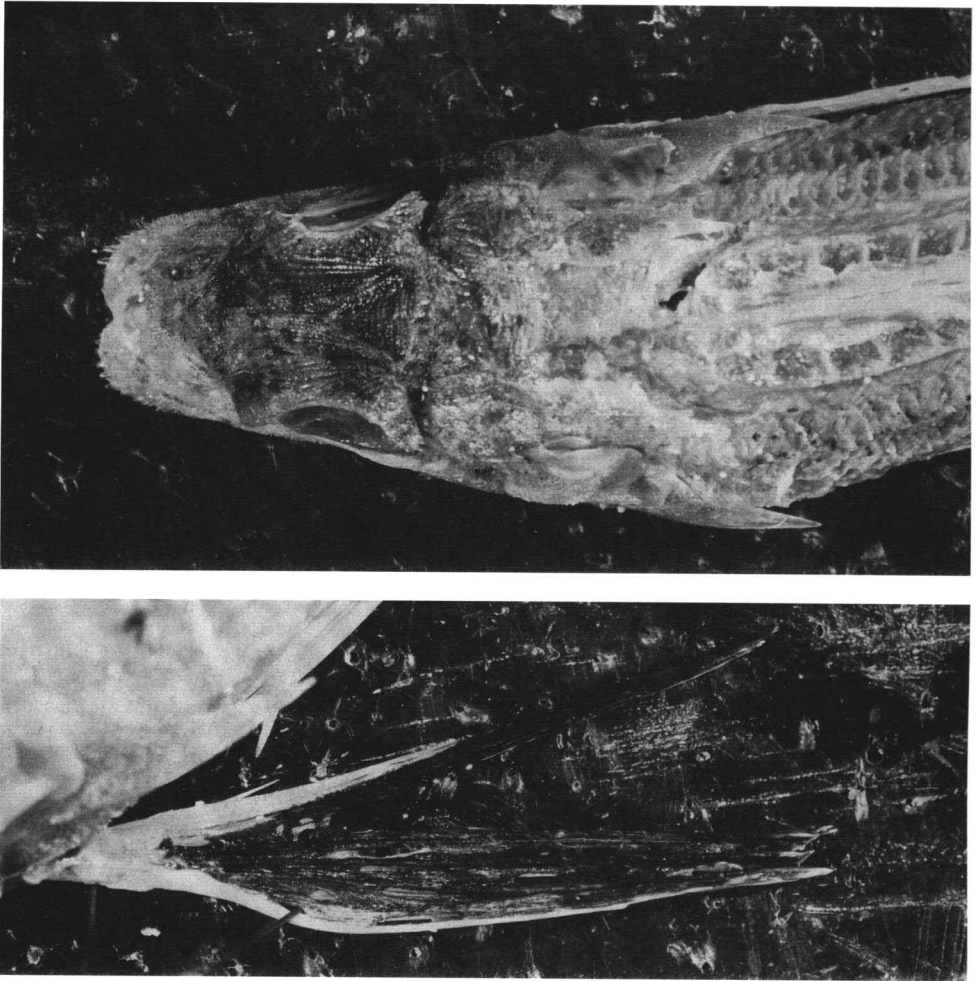


Figure 4. Dorsal view of the head (upper) and view of the inner surface of the pectoral fin (lower) of *Lepidotrigla brachyoptera*, USNM 332059, 126.4 mm SL.

rostral process of the first infraorbital bone [type O of Richards (1992), but with short spines]; opercular spine short, barely projecting beyond opercular flap; pectoral fin of moderate length (27.9–36.4%SL) reaching anal fin origin; scales strongly ctenoid (transforming cteni of Roberts, 1993) and firmly attached; nape scaled, breast and interpelvic area naked, belly scaled; lateral line scales 60–66, 2 to 4 scale rows above and 10 to 12 rows below the lateral line; 9 (rarely 10) first dorsal spines, 15–17 second dorsal rays, 16–17 (rarely 18) anal rays, 11 (rarely 12) plus 3 free pectoral rays; 23–25 bucklers along base of dorsal fins; 33 vertebrae (12 precaudal, 21 caudal); head length short (25.7–33.7%SL); interorbital width moderate (6.0–9.9%SL); 6–7 slender (2.0–2.7%SL) gill rakers on first ceratobranchial.

Description.—Measurements and counts for the material examined are given in Table 1. Rostral spines of first infraorbital bone are type O of Richards (1992, p.46)—but with many short spines (Fig. 4). Nuchal spine long extending beyond

dorsal fin origin; postorbital groove present with parietal ridge posteriorly and otic ridge posterior to eye; eye large (8.4–12.5%SL); sharp spines on anterodorsal edge of orbital rim; opercular spine short extending slightly beyond opercular membrane; preopercular spine short with slight ridge extending onto cheek; no nasal spines; cleithral spine strong (13.3–15.4%SL); first dorsal fin spines with serrate spines on anterior edge; nape fully scaled; breast, prepectoral area and interpelvic area scaleless, belly fully scaled; scales large with strong ctenii (2–3.5 rows above lateral line, 10–12 rows below lateral line). Lateral line scales higher than wide with 5 tubes anteriorly progressively reducing to 3 tubes posteriorly and scales progressively smaller posteriorly. Gill rakers slender (2.0–2.7%SL) bearing fine spines, 6–7 on first ceratobranchial, 0 or 1 raker and 1 or 0 rudiments on first epibranchial, 2–3 rudiments on first ceratobranchial, and 4 rudiments on first hypobranchial. Baudelot's ligament on 1st vertebra; 1st closed hemal arch on 10th vertebra. First two neural spines close together; dorsal pterygiophores interdigitating as follows (based on one cleared and stained specimen USNM 332059): first between 2nd and 3rd neural spines, second and third between neural spines 3 and 4, remaining interdigitating singly except 14th and 15th between neural spines of vertebrae 14 and 15, last pterygiophore followed by stay. First dorsal pterygiophore supporting first two dorsal fin spines (first directly, second serially) remaining each supporting one spine or ray serially including 9th with very small spine associated with it (this spine easily overlooked because of small size). First four anal pterygiophores between hemal spines of 13th and 14th vertebrae and bear 5 anal rays, 5th through 15th pterygiophores interdigitating singly between hemal spines of vertebrae 14 through 25th while last two interdigitating between hemal spines of 25th and 26th vertebrae. Last pterygiophore followed by stay. Caudal complex with hypurals 1 and 2 fused, 3 and 4 fused, 5th free, parhypural resting against hypurals and with strong lateral projection, together supporting 8 upper and 7 lower caudal fin rays. Ten upper secondary caudal rays and 10 lower secondary caudal rays. No uroneurals, 2 epurals above last vertebra, 1 epural associated with dorsal parapophysis of 32nd vertebrae. Cartilage located at posterior end of epurals 2 and 3 and 5th hypural, and 2 pieces between end of parhypural and last autochthonous hemal spine, and 1 piece at end of hemal spine of 31st vertebrae. Vertebrae total 33 with 12 precaudal and 21 caudal.

Color in Alcohol.—Head and body uniformly pale with no dark spotting evident. Medial rays of pectoral fin black, faint black spot present in membranes between 4th and 6th dorsal spine in few specimens.

Distribution.—This species is confined to the shore waters of New Zealand including the North and South Islands, Stewart Island, and the Chatham Islands in 36–234 m.

DISCUSSION

The species of *Lepidotrigla* are very numerous, many are undescribed, and they occur in the eastern Atlantic, Indian and western Pacific Oceans. In my last paper on this group (Richards, 1992), I discussed many of the characters and listed all of the described species. I concluded that until all of the species are thoroughly studied and all characters evaluated, the genus cannot be accurately diagnosed. For this new species, it appears to be morphologically quite similar and geographically closest to *L. brachyoptera*. However, it is premature to comment on relationships since many of the undescribed forms are found around Australia and Fiji. The species are morphologically compared in the preceding accounts.

Lepidotrigla robinsi new species, is the only triglid known from the Kermadec Islands. *L. brachyoptera*, listed from these islands (Francis, 1993), was based on a misidentification of the new species. The Kermadecs, together with Lord Howe, Norfolk, Rapa, Pitcairn, Easter, and San Felix Islands are of zoogeographic interest because they are widely spaced islands between Australia and South America between the latitudes 24° and 32° S (Francis, 1991, 1993; Francis and Randall, 1993). The triglid, *Chelidonichthys kumu* Lesson, is known from one of these islands (Lord Howe), as well as Australia and New Zealand (Francis, 1993, my own research, and others). *L. brachyoptera* is endemic to New Zealand, *L. robinsi* is endemic to the Kermadecs, and a large number of genera and species of triglids are found in Australia. Francis (1993) does not consider the San Felix Islands because they are influenced by the Peru Current, but the triglid *Pterygotrigla picta* Günther occurs there. It is very closely related to a congener found in New Zealand and Australian waters. In many accounts (Paulin et al., 1989) *P. picta* is listed as occurring in the last two areas, but in my ongoing work it appears that *P. picta* is endemic to islands off Chile and *P. andertoni* Waite is the appropriate name for the New Zealand and Australian species. However, the two species are very closely related indicating recent speciation (a paper in preparation on this subject treats the South temperate species of *Pterygotrigla*). As a result, the San Felix fauna cannot be discounted when discussing these southern Pacific island groups.

To the north of these islands, triglids are unknown until one reaches Christmas Island (01°50'S) in the Line Islands, where *L. jimjoebob* Richards, 1992 is found. To the west triglids of several genera are commonly found around New Guinea, New Caledonia, and the Philippines. In the North Pacific *Chelidonichthys kumu* has been collected from the island of Hawaii (Pietschmann, 1930). This is a valid record and I have examined the specimen in the Bishop Museum (BPBM 3463), but it has been overlooked in all checklists of Hawaiian fishes. In addition several species of peristediids in the genera *Satyrichthys* and *Peristedion* are known from scattered locations. Species relationships of these two genera are poorly understood at present and revisionary work by several researchers is underway.

As more collecting is done around these Pacific islands it is likely that more triglids will be found. Most occur below diving depths and are too small for commercial hook and line. Specialized trawls and dredges are the most practical means of collecting triglids, but do not operate well over volcanic and coral substrate (most seamounts comprise volcanic rock and fossilized coral). *Lepidotrigla* spp. and *Chelidonichthys* spp. are benthic fishes which inhabit sand, mud, or rubble bottoms where they utilize their free pectoral rays to stir the bottom and sense prey organisms. Such habitats in volcanic areas are probably limited which may account for low population sizes and consequently limited collections. Some species have a good ability for long distance transport and some do not, thus not all fit plate distributions of Springer (1982).

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